



## SEQUENCE LISTING

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<120> Thermostable Xylanases

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<141> 2001-09-13

<150> 60/108,504

<151> 1998-11-16

<160> 65

<170> PatentIn Ver. 2.1

<210> 1

<211> 184

<212> PRT

<213> Aspergillus niger

<400> 1

Ser Ala Gly Ile Asn Tyr Val Gln Asn Tyr Asn Gly Asn Leu Gly Asp  
1 5 10 15

Phe Thr Tyr Asp Glu Ser Ala Gly Thr Phe Ser Met Tyr Trp Glu Asp  
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Gly Val Ser Ser Asp Phe Val Val Gly Leu Gly Trp Thr Thr Gly Ser  
35 40 45

Ser Asn Ala Ile Thr Tyr Ser Ala Glu Tyr Ser Ala Ser Gly Ser Ser  
50 55 60

Ser Tyr Leu Ala Val Tyr Gly Trp Val Asn Tyr Pro Gly Ala Glu Tyr  
65 70 75 80

Tyr Ile Val Glu Asp Tyr Gly Asp Tyr Asn Pro Cys Ser Ser Ala Thr  
85 90 95

Ser Leu Gly Thr Val Tyr Ser Asp Gly Ser Thr Tyr Gln Val Cys Thr  
100 105 110

Asp Thr Arg Ile Asn Glu Pro Ser Ile Thr Gly Thr Ser Thr Phe Thr  
115 120 125

Gln Tyr Phe Ser Val Arg Glu Ser Thr Arg Thr Ser Gly Thr Val Thr  
130 135 140

Val Ala Asn His Phe Asn Phe Trp Ala Gln His Gly Phe Gly Asn Ser  
145 150 155 160

Asp Phe Asn Tyr Gln Val Met Ala Val Glu Ala Trp Ser Gly Ala Gly  
165 170 175

Ser Ala Ser Val Thr Ile Ser Ser  
180

<210> 2

<211> 185

<212> PRT

<213> *Aspergillus tubingensis*

<400> 2

Ser Ala Gly Ile Asn Tyr Val Gln Asn Tyr Asn Gln Asn Leu Gly Asp  
1 5 10 15

Phe Thr Tyr Asp Glu Ser Ala Gly Thr Phe Ser Met Tyr Trp Glu Asp  
20 25 30

Gly Val Ser Ser Asp Phe Val Val Gly Leu Gly Gly Trp Thr Thr Gly  
35 40 45

Ser Ser Asn Ala Ile Thr Tyr Ser Ala Glu Tyr Ser Ala Ser Gly Ser  
50 55 60

Ala Ser Tyr Leu Ala Val Tyr Gly Trp Val Asn Tyr Pro Gln Ala Glu  
65 70 75 80

Tyr Tyr Ile Val Glu Asp Tyr Gly Asp Tyr Asn Pro Cys Ser Ser Ala  
85 90 95

Thr Ser Leu Gly Thr Val Tyr Ser Asp Gly Ser Thr Tyr Gln Val Cys  
100 105 110

Thr Asp Thr Arg Ile Asn Glu Pro Ser Ile Thr Gly Thr Ser Thr Phe  
115 120 125

Thr Gln Tyr Phe Ser Val Arg Glu Ser Thr Arg Thr Ser Gly Thr Val  
130 135 140

Thr Val Ala Asn His Phe Asn Phe Trp Ala His His Gly Phe His Asn  
145 150 155 160

Ser Asp Phe Asn Tyr Gln Val Val Ala Val Glu Ala Trp Ser Gly Ala  
165 170 175

Gly Ser Ala Ala Val Thr Ile Ser Ser  
180 185

<210> 3

<211> 185

<212> PRT

<213> *Bacillus circulans*

<400> 3

Ala Ser Thr Asp Tyr Trp Gln Asn Trp Thr Asp Gly Gly Gly Ile Val  
1 5 10 15

Asn	Ala	Val	Asn	Gly	Ser	Gly	Gly	Asn	Tyr	Ser	Val	Asn	Trp	Ser	Asn	
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Thr	Gly	Asn	Phe	Val	Val	Gly	Lys	Gly	Trp	Thr	Thr	Gly	Ser	Pro	Phe	
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Arg	Thr	Ile	Asn	Tyr	Asn	Ala	Gly	Val	Trp	Ala	Pro	Asn	Gly	Asn	Gly	
	50					55					60					
Tyr	Leu	Thr	Leu	Tyr	Gly	Trp	Thr	Arg	Ser	Pro	Leu	Ile	Glu	Tyr	Tyr	
	65				70					75					80	
Val	Val	Asp	Ser	Trp	Gly	Thr	Tyr	Arg	Pro	Thr	Gly	Thr	Tyr	Lys	Gly	
				85					90					95		
Thr	Val	Lys	Ser	Asp	Gly	Gly	Thr	Tyr	Asp	Ile	Tyr	Thr	Thr	Thr	Arg	
			100					105					110			
Tyr	Asn	Ala	Pro	Ser	Ile	Asp	Gly	Asp	Arg	Thr	Thr	Phe	Thr	Gln	Tyr	
	115						120					125				
Trp	Ser	Val	Arg	Gln	Ser	Lys	Arg	Pro	Thr	Gly	Ser	Asn	Ala	Thr	Ile	
	130					135						140				
Thr	Phe	Thr	Asn	His	Val	Asn	Ala	Trp	Lys	Ser	His	Gly	Met	Asn	Leu	
	145				150					155					160	
Gly	Ser	Asn	Trp	Ala	Tyr	Gln	Val	Met	Ala	Thr	Glu	Gly	Tyr	Gln	Ser	
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Ser	Gly	Ser	Ser	Asn	Val	Thr	Val	Trp								
			180					185								

<210> 4  
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 <212> PRT  
 <213> Bacillus pumilus

<400> 4																
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Glu	Leu	Trp	Lys	Asp	Tyr	Gly	Asn	Thr	Ser	Met	Thr	Leu	Asn	Asn	Gly	
			20					25					30			
Gly	Ala	Phe	Ser	Ala	Gly	Trp	Asn	Asn	Ile	Gly	Asn	Ala	Leu	Phe	Arg	
		35					40					45				
Lys	Gly	Lys	Lys	Phe	Asp	Ser	Thr	Arg	Thr	His	His	Gln	Leu	Gly	Asn	
	50					55					60					
Ile	Ser	Ile	Asn	Tyr	Asn	Ala	Ser	Phe	Asn	Pro	Ser	Gly	Asn	Ser	Tyr	
	65				70					75					80	
Leu	Cys	Val	Tyr	Gly	Trp	Thr	Gln	Ser	Pro	Leu	Ala	Glu	Tyr	Tyr	Ile	
				85					90					95		

Val Asp Ser Trp Gly Thr Tyr Arg Pro Thr Gly Ala Tyr Lys Gly Ser  
                   100                                  105                                  110  
 Phe Tyr Ala Asp Gly Gly Thr Tyr Asp Ile Tyr Glu Thr Thr Arg Val  
                   115                                  120                                  125  
 Asn Gln Pro Ser Ile Ile Gly Ile Ala Thr Phe Lys Gln Tyr Trp Ser  
                   130                                  135                                  140  
 Val Arg Gln Thr Lys Arg Thr Ser Gly Thr Val Ser Val Ser Ala His  
                   145                                  150                                  155                                  160  
 Phe Arg Lys Trp Glu Ser Leu Gly Met Pro Met Gly Lys Met Tyr Glu  
                                   165                                  170                                  175  
 Thr Ala Phe Thr Val Glu Gly Tyr Gln Ser Ser Gly Ser Ala Asn Val  
                                   180                                  185                                  190  
 Met Thr Asn Gln Leu Phe Ile Gly Asn  
                   195                                  200

<210> 5  
 <211> 185  
 <212> PRT  
 <213> Bacillus subtilis

<400> 5  
 Ala Ser Thr Asp Tyr Trp Gln Asn Trp Thr Asp Gly Gly Gly Ile Val  
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 Asn Ala Val Asn Gly Ser Gly Gly Asn Tyr Ser Val Asn Trp Ser Asn  
                   20                                  25                                  30  
 Thr Gly Asn Phe Val Val Gly Lys Gly Trp Thr Thr Gly Ser Pro Phe  
                   35                                  40                                  45  
 Arg Thr Ile Asn Tyr Asn Ala Gly Val Trp Ala Pro Asn Gly Asn Gly  
                   50                                  55                                  60  
 Tyr Leu Thr Leu Tyr Gly Trp Thr Arg Ser Pro Leu Ile Glu Tyr Tyr  
                   65                                  70                                  75                                  80  
 Val Val Asp Ser Trp Gly Thr Tyr Arg Pro Thr Gly Thr Tyr Lys Gly  
                                   85                                  90                                  95  
 Thr Val Lys Ser Asp Gly Gly Thr Tyr Asp Ile Tyr Thr Thr Thr Arg  
                                   100                                  105                                  110  
 Tyr Asn Ala Pro Ser Ile Asp Gly Asp Arg Thr Thr Phe Thr Gln Tyr  
                   115                                  120                                  125  
 Trp Ser Val Arg Gln Ser Lys Arg Pro Thr Gly Ser Asn Ala Thr Ile  
                   130                                  135                                  140

Thr Phe Ser Asn His Val Asn Ala Trp Lys Ser His Gly Met Asn Leu  
 145 150 155 160

Gly Ser Asn Trp Ala Tyr Gln Val Met Ala Thr Glu Gly Tyr Gln Ser  
 165 170 175

Ser Gly Ser Ser Asn Val Thr Val Trp  
 180 185

<210> 6

<211> 211

<212> PRT

<213> Clostridium acetobutylicum

<400> 6

Ser Ala Phe Asn Thr Gln Ala Ala Pro Lys Thr Ile Thr Ser Asn Glu  
 1 5 10 15

Ile Gly Val Asn Gly Gly Tyr Asp Tyr Glu Leu Trp Lys Asp Tyr Gly  
 20 25 30

Asn Thr Ser Met Thr Leu Lys Asn Gly Gly Ala Phe Ser Cys Gln Trp  
 35 40 45

Ser Asn Ile Gly Asn Ala Leu Phe Arg Lys Gly Lys Lys Phe Asn Asp  
 50 55 60

Thr Gln Thr Tyr Lys Gln Leu Gly Asn Ile Ser Val Asn Tyr Asn Cys  
 65 70 75 80

Asn Tyr Gln Pro Tyr Gly Asn Ser Tyr Leu Cys Val Tyr Gly Trp Thr  
 85 90 95

Ser Ser Pro Leu Val Glu Tyr Tyr Ile Val Asp Ser Trp Gly Ser Trp  
 100 105 110

Arg Pro Pro Gly Gly Thr Ser Lys Gly Thr Ile Thr Val Asp Gly Gly  
 115 120 125

Ile Tyr Asp Ile Tyr Glu Thr Thr Arg Ile Asn Gln Pro Ser Ile Gln  
 130 135 140

Gly Asn Thr Thr Phe Lys Gln Tyr Trp Ser Val Arg Arg Thr Lys Arg  
 145 150 155 160

Thr Ser Gly Thr Ile Ser Val Ser Lys His Phe Ala Ala Trp Glu Ser  
 165 170 175

Lys Gly Met Pro Leu Gly Lys Met His Glu Thr Ala Phe Asn Ile Glu  
 180 185 190

Gly Tyr Gln Ser Ser Gly Lys Ala Asp Val Asn Ser Met Ser Ile Asn  
 195 200 205

Ile Gly Lys  
 210

<210> 7  
 <211> 206  
 <212> PRT  
 <213> Clostridium stercorarium

<400> 7  
 Gly Arg Ile Ile Tyr Asp Asn Glu Thr Gly Thr His Gly Gly Tyr Asp  
   1                  5                  10                  15  
 Tyr Glu Leu Trp Lys Asp Tyr Gly Asn Thr Ile Met Glu Leu Asn Asp  
                   20                  25                  30  
 Gly Gly Thr Phe Ser Cys Gln Trp Ser Asn Ile Gly Asn Ala Leu Phe  
           35                  40                  45  
 Arg Lys Gly Arg Lys Phe Asn Ser Asp Lys Thr Tyr Gln Glu Leu Gly  
       50                  55                  60  
 Asp Ile Val Val Glu Tyr Gly Cys Asp Tyr Asn Pro Asn Gly Asn Ser  
   65                  70                  75                  80  
 Tyr Leu Cys Val Tyr Gly Trp Thr Arg Asn Phe Leu Val Glu Tyr Tyr  
                   85                  90                  95  
 Ile Val Glu Ser Trp Gly Ser Trp Arg Pro Pro Gly Ala Thr Pro Lys  
           100                  105                  110  
 Gly Thr Ile Thr Gln Trp Met Ala Gly Thr Tyr Glu Ile Tyr Glu Thr  
       115                  120                  125  
 Thr Arg Val Asn Gln Pro Ser Ile Asp Gly Thr Ala Thr Phe Gln Gln  
       130                  135                  140  
 Tyr Trp Ser Val Arg Thr Ser Lys Arg Thr Ser Gly Thr Ile Ser Val  
   145                  150                  155                  160  
 Thr Glu His Phe Lys Gln Trp Glu Arg Met Gly Met Arg Met Gly Lys  
           165                  170                  175  
 Met Tyr Glu Val Ala Leu Thr Val Glu Gly Tyr Gln Ser Ser Gly Tyr  
       180                  185                  190  
 Ala Asn Val Tyr Lys Asn Glu Ile Arg Ile Gly Ala Asn Pro  
       195                  200                  205

<210> 8  
 <211> 211  
 <212> PRT  
 <213> Ruminococcus flavefaciens

<400> 8  
 Ser Ala Ala Asp Gln Gln Thr Arg Gly Asn Val Gly Gly Tyr Asp Tyr  
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Glu Met Trp Asn Gln Asn Gly Gln Gly Gln Ala Ser Met Asn Pro Gly  
                   20                                  25                                  30  
 Ala Gly Ser Phe Thr Cys Ser Trp Ser Asn Ile Glu Asn Phe Leu Ala  
                   35                                  40                                  45  
 Arg Met Gly Lys Asn Tyr Asp Ser Gln Lys Lys Asn Tyr Lys Ala Phe  
                   50                                  55                                  60  
 Gly Asn Ile Val Leu Thr Tyr Asp Val Glu Tyr Thr Pro Arg Gly Asn  
                   65                                  70                                  75                                  80  
 Ser Tyr Met Cys Val Tyr Gly Trp Thr Arg Asn Pro Leu Met Glu Tyr  
                                   85                                  90                                  95  
 Tyr Ile Val Glu Gly Trp Gly Asp Trp Arg Pro Pro Gly Asn Asp Gly  
                   100                                  105                                  110  
 Glu Val Lys Gly Thr Val Ser Ala Asn Gly Asn Thr Tyr Asp Ile Arg  
                   115                                  120                                  125  
 Lys Thr Met Arg Tyr Asn Gln Pro Ser Leu Asp Gly Thr Ala Thr Phe  
                   130                                  135                                  140  
 Pro Gln Tyr Trp Ser Val Arg Gln Thr Ser Gly Ser Ala Asn Asn Gln  
                   145                                  150                                  155                                  160  
 Thr Asn Tyr Met Lys Gly Thr Ile Asp Val Ser Lys His Phe Asp Ala  
                                   165                                  170                                  175  
 Trp Ser Ala Ala Gly Leu Asp Met Ser Gly Thr Leu Tyr Glu Val Ser  
                   180                                  185                                  190  
 Leu Asn Ile Glu Gly Tyr Arg Ser Asn Gly Ser Ala Asn Val Lys Ser  
                   195                                  200                                  205  
 Val Ser Val  
                   210

<210> 9  
 <211> 197  
 <212> PRT  
 <213> Schizophyllum commune

<400> 9  
 Ser Gly Thr Pro Ser Ser Thr Gly Thr Asp Gly Gly Tyr Tyr Tyr Ser  
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 Trp Trp Thr Asp Gly Ala Gly Asp Ala Thr Tyr Gln Asn Asn Gly Gly  
                   20                                  25                                  30  
 Gly Ser Tyr Thr Leu Thr Trp Ser Gly Asn Asn Gly Asn Leu Val Gly  
                   35                                  40                                  45  
 Gly Lys Gly Trp Asn Pro Gly Ala Ala Ser Arg Ser Ile Ser Tyr Ser  
           50                                  55                                  60

Gly Thr Tyr Gln Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp  
 65 70 75 80  
 Thr Arg Ser Ser Leu Ile Glu Tyr Tyr Ile Val Glu Ser Tyr Gly Ser  
 85 90 95  
 Tyr Asp Pro Ser Ser Ala Ala Ser His Lys Gly Ser Val Thr Cys Asn  
 100 105 110  
 Gly Ala Thr Tyr Asp Ile Leu Ser Thr Trp Arg Tyr Asn Ala Pro Ser  
 115 120 125  
 Ile Asp Gly Thr Gln Thr Phe Glu Gln Phe Trp Ser Val Arg Asn Pro  
 130 135 140  
 Lys Lys Ala Pro Gly Gly Ser Ile Ser Gly Thr Val Asp Val Gln Cys  
 145 150 155 160  
 His Phe Asp Ala Trp Lys Gly Leu Gly Met Asn Leu Gly Ser Glu His  
 165 170 175  
 Asn Tyr Gln Ile Val Ala Thr Glu Gly Tyr Gln Ser Ser Gly Thr Ala  
 180 185 190  
 Thr Ile Thr Val Thr  
 195

<210> 10  
 <211> 191  
 <212> PRT  
 <213> Streptomyces lividans

<400> 10  
 Asp Thr Val Val Thr Thr Asn Gln Glu Gly Thr Asn Asn Gly Tyr Tyr  
 1 5 10 15  
 Tyr Ser Phe Trp Thr Asp Ser Gln Gly Thr Val Ser Met Asn Met Gly  
 20 25 30  
 Ser Gly Gly Gln Tyr Ser Thr Ser Trp Arg Asn Thr Gly Asn Phe Val  
 35 40 45  
 Ala Gly Lys Gly Trp Ala Asn Gly Gly Arg Arg Thr Val Gln Tyr Ser  
 50 55 60  
 Gly Ser Phe Asn Pro Ser Gly Asn Ala Tyr Leu Ala Leu Tyr Gly Trp  
 65 70 75 80  
 Thr Ser Asn Pro Leu Val Glu Tyr Tyr Ile Val Asp Asn Trp Gly Thr  
 85 90 95  
 Tyr Arg Pro Thr Gly Glu Tyr Lys Gly Thr Val Thr Ser Asp Gly Gly  
 100 105 110



Thr	Tyr	Asp	Ile	Tyr	Lys	Thr	Thr	Arg	Val	Asn	Lys	Pro	Ser	Val	Glu
		115						120						125	
Gly	Thr	Arg	Thr	Phe	Asp	Gln	Tyr	Trp	Ser	Val	Arg	Gln	Ser	Lys	Arg
	130					135					140				
Thr	Gly	Gly	Thr	Ile	Thr	Thr	Gly	Asn	His	Phe	Asp	Ala	Trp	Ala	Arg
145					150					155					160
Ala	Gly	Met	Pro	Leu	Gly	Asn	Phe	Ser	Tyr	Tyr	Met	Ile	Asn	Ala	Thr
				165					170					175	
Glu	Gly	Tyr	Gln	Ser	Ser	Gly	Thr	Ser	Ser	Ile	Asn	Val	Gly	Gly	
			180					185					190		

<210> 11  
 <211> 191  
 <212> PRT  
 <213> Streptomyces lividans

<400> 11															
Ala	Thr	Thr	Ile	Thr	Thr	Asn	Gln	Thr	Gly	Thr	Asp	Gly	Met	Tyr	Tyr
1				5					10					15	
Ser	Phe	Trp	Thr	Asp	Gly	Gly	Gly	Ser	Val	Ser	Met	Thr	Leu	Asn	Gly
			20					25					30		
Gly	Gly	Ser	Tyr	Ser	Thr	Gln	Trp	Thr	Asn	Cys	Gly	Asn	Phe	Val	Ala
		35					40					45			
Gly	Lys	Gly	Trp	Ser	Thr	Gly	Asp	Gly	Asn	Val	Arg	Tyr	Asn	Gly	Tyr
	50					55					60				
Phe	Asn	Pro	Val	Gly	Asn	Gly	Tyr	Gly	Cys	Leu	Tyr	Gly	Trp	Thr	Ser
65					70					75					80
Asn	Pro	Leu	Val	Glu	Tyr	Tyr	Ile	Val	Asp	Asn	Trp	Gly	Ser	Tyr	Arg
			85						90					95	
Pro	Thr	Gly	Thr	Tyr	Lys	Gly	Thr	Val	Ser	Ser	Asp	Gly	Gly	Thr	Tyr
			100					105					110		
Asp	Ile	Tyr	Gln	Thr	Thr	Arg	Tyr	Asn	Ala	Pro	Ser	Val	Glu	Gly	Thr
	115						120					125			
Lys	Thr	Phe	Gln	Gln	Tyr	Trp	Ser	Val	Arg	Gln	Ser	Lys	Val	Thr	Ser
	130					135					140				
Gly	Ser	Gly	Thr	Ile	Thr	Thr	Gly	Asn	His	Phe	Asp	Ala	Trp	Ala	Arg
145					150					155					160
Ala	Gly	Met	Asn	Met	Gly	Gln	Phe	Arg	Tyr	Tyr	Met	Ile	Asn	Ala	Thr
				165					170					175	
Glu	Gly	Tyr	Gln	Ser	Ser	Gly	Ser	Ser	Asn	Ile	Thr	Val	Ser	Gly	
			180					185					190		

<210> 12  
 <211> 189  
 <212> PRT  
 <213> Streptomyces sp.

<400> 12  
 Ala Thr Thr Ile Thr Asn Glu Thr Gly Tyr Asp Gly Met Tyr Tyr Ser  
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 Phe Trp Thr Asp Gly Gly Gly Ser Val Ser Met Thr Leu Asn Gly Gly  
                     20                    25                    30  
 Gly Ser Tyr Ser Thr Arg Trp Thr Asn Cys Gly Asn Phe Val Ala Gly  
                     35                    40                    45  
 Lys Gly Trp Ala Asn Gly Gly Arg Arg Thr Val Arg Tyr Thr Gly Trp  
                     50                    55                    60  
 Phe Asn Pro Ser Gly Asn Gly Tyr Gly Cys Leu Tyr Gly Trp Thr Ser  
     65                    70                    75                    80  
 Asn Pro Leu Val Glu Tyr Tyr Ile Val Asp Asn Trp Gly Ser Tyr Arg  
                     85                    90                    95  
 Pro Thr Gly Glu Thr Arg Gly Thr Val His Ser Asp Gly Gly Thr Tyr  
                     100                    105                    110  
 Asp Ile Tyr Lys Thr Thr Arg Tyr Asn Ala Pro Ser Val Glu Ala Pro  
                     115                    120                    125  
 Ala Ala Phe Asp Gln Tyr Trp Ser Val Arg Gln Ser Lys Val Thr Ser  
                     130                    135                    140  
 Gly Thr Ile Thr Thr Gly Asn His Phe Asp Ala Trp Ala Arg Ala Gly  
     145                    150                    155                    160  
 Met Asn Met Gly Asn Phe Arg Tyr Tyr Met Ile Asn Ala Thr Glu Gly  
                     165                    170                    175  
 Tyr Gln Ser Ser Gly Ser Ser Thr Ile Thr Val Ser Gly  
                     180                    185

<210> 13  
 <211> 189  
 <212> PRT  
 <213> Thermomonospora fusca

<400> 13  
 Ala Val Thr Ser Asn Glu Thr Gly Tyr His Asp Gly Tyr Phe Tyr Ser  
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 Phe Trp Thr Asp Ala Pro Gly Thr Val Ser Met Glu Leu Gly Pro Gly  
                     20                    25                    30

Gly Asn Tyr Ser Thr Ser Trp Arg Asn Thr Gly Asn Phe Val Ala Gly  
                   35                                  40                                  45  
 Lys Gly Trp Ala Thr Gly Gly Arg Arg Thr Val Thr Tyr Ser Ala Ser  
           50                                  55                                  60  
 Phe Asn Pro Ser Gly Asn Ala Tyr Leu Thr Leu Tyr Gly Trp Thr Arg  
   65                                  70                                  75                                  80  
 Asn Pro Leu Val Glu Tyr Tyr Ile Val Glu Ser Trp Gly Thr Tyr Arg  
                                   85                                  90                                  95  
 Pro Thr Gly Thr Tyr Met Gly Thr Val Thr Thr Asp Gly Gly Thr Tyr  
                   100                                  105                                  110  
 Asp Ile Tyr Lys Thr Thr Arg Tyr Asn Ala Pro Ser Ile Glu Gly Thr  
           115                                  120                                  125  
 Arg Thr Phe Asp Gln Tyr Trp Ser Val Arg Gln Ser Lys Arg Thr Ser  
   130                                  135                                  140  
 Gly Thr Ile Thr Ala Gly Asn His Phe Asp Ala Trp Ala Arg His Gly  
   145                                  150                                  155                                  160  
 Met His Leu Gly Thr His Asp Tyr Met Ile Met Ala Thr Glu Gly Tyr  
                   165                                  170                                  175  
 Gln Ser Ser Gly Ser Ser Asn Val Thr Leu Gly Thr Ser  
                   180                                  185

<210> 14  
 <211> 190  
 <212> PRT  
 <213> Trichoderma harzianum

<400> 14  
 Gln Thr Ile Gly Pro Gly Thr Gly Tyr Ser Asn Gly Tyr Tyr Tyr Ser  
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 Tyr Trp Asn Asp Gly His Ala Gly Val Thr Tyr Thr Asn Gly Gly Gly  
                   20                                  25                                  30  
 Gly Ser Phe Thr Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly  
           35                                  40                                  45  
 Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly  
   50                                  55                                  60  
 Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Ile Tyr Gly Trp Ser  
   65                                  70                                  75                                  80  
 Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr  
                   85                                  90                                  95  
 Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Ser Asp Gly  
           100                                  105                                  110

Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile  
 115 120 125  
 Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His  
 130 135 140  
 Arg Ser Ser Gly Ser Val Asn Thr Ala Asn His Phe Asn Ala Trp Ala  
 145 150 155 160  
 Ser His Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val  
 165 170 175  
 Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser  
 180 185 190

<210> 15  
 <211> 178  
 <212> PRT  
 <213> Trichoderma reesei

<400> 15  
 Ala Ser Ile Asn Tyr Asp Gln Asn Tyr Gln Thr Gly Gly Gln Val Ser  
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 Tyr Ser Pro Ser Asn Thr Gly Phe Ser Val Asn Trp Asn Thr Gln Asp  
 20 25 30  
 Asp Phe Val Val Gly Val Gly Trp Thr Thr Gly Ser Ser Ala Pro Ile  
 35 40 45  
 Asn Phe Gly Gly Ser Phe Ser Val Asn Ser Gly Thr Gly Leu Leu Ser  
 50 55 60  
 Val Tyr Gly Trp Ser Thr Asn Pro Leu Val Glu Tyr Tyr Ile Met Glu  
 65 70 75 80  
 Asp Asn His Asn Tyr Pro Ala Gln Gly Thr Val Lys Gly Thr Val Thr  
 85 90 95  
 Ser Asp Gly Ala Thr Tyr Thr Ile Trp Glu Asn Thr Arg Val Asn Glu  
 100 105 110  
 Pro Ser Ile Gln Gly Thr Ala Thr Phe Asn Gln Tyr Ile Ser Val Arg  
 115 120 125  
 Asn Ser Pro Arg Thr Ser Gly Thr Val Thr Val Gln Asn His Phe Asn  
 130 135 140  
 Trp Ala Ser Leu Gly Leu His Leu Gly Gln Met Met Asn Tyr Gln Val  
 145 150 155 160  
 Val Ala Val Glu Gly Trp Gly Gly Ser Gly Ser Ala Ser Gln Ser Val  
 165 170 175  
 Ser Asn

<210> 16  
<211> 190

<212> PRT  
<213> Trichoderma reesei

<400> 16

Gln	Thr	Ile	Gln	Pro	Gly	Thr	Gly	Tyr	Asn	Asn	Gly	Tyr	Phe	Tyr	Ser	
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Tyr	Trp	Asn	Asp	Gly	His	Gly	Gly	Val	Thr	Tyr	Thr	Asn	Gly	Pro	Gly	
			20					25					30			
Gly	Gln	Phe	Ser	Val	Asn	Trp	Ser	Asn	Ser	Gly	Asn	Phe	Val	Gly	Gly	
		35					40					45				
Lys	Gly	Trp	Gln	Pro	Gly	Thr	Lys	Asn	Lys	Val	Ile	Asn	Phe	Ser	Gly	
	50					55					60					
Ser	Tyr	Asn	Pro	Asn	Gly	Asn	Ser	Tyr	Leu	Ser	Val	Tyr	Gly	Trp	Ser	
	65				70					75					80	
Arg	Asn	Pro	Leu	Ile	Glu	Tyr	Tyr	Ile	Val	Glu	Asn	Phe	Gly	Thr	Tyr	
				85					90					95		
Asn	Pro	Ser	Thr	Gly	Ala	Thr	Lys	Leu	Gly	Glu	Val	Thr	Ser	Asp	Gly	
			100					105						110		
Ser	Val	Tyr	Asp	Ile	Tyr	Arg	Thr	Gln	Arg	Val	Asn	Gln	Pro	Ser	Ile	
		115					120					125				
Ile	Gly	Thr	Ala	Thr	Phe	Tyr	Gln	Tyr	Trp	Ser	Val	Arg	Arg	Asn	His	
	130					135					140					
Arg	Ser	Ser	Gly	Ser	Val	Asn	Thr	Ala	Asn	His	Phe	Asn	Ala	Trp	Ala	
	145				150					155					160	
Gln	Gln	Gly	Leu	Thr	Leu	Gly	Thr	Met	Asp	Tyr	Gln	Ile	Val	Ala	Val	
			165					170						175		
Glu	Gly	Tyr	Phe	Ser	Ser	Gly	Ser	Ala	Ser	Ile	Thr	Val	Ser			
			180					185					190			

<210> 17  
<211> 190  
<212> PRT  
<213> Trichoderma viride

<400> 17

Gln	Thr	Ile	Gln	Pro	Gly	Thr	Gly	Phe	Asn	Asn	Gly	Tyr	Phe	Tyr	Ser	
1				5					10					15		
Tyr	Trp	Asn	Asp	Gly	His	Gly	Gly	Val	Thr	Tyr	Thr	Asn	Gly	Pro	Gly	
			20					25					30			

Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly  
           35                          40                          45  
 Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly  
           50                          55                          60  
 Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser  
           65                          70                          75                          80  
 Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr  
                           85                          90                          95  
 Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Ser Asp Gly  
                           100                          105                          110  
 Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile  
           115                          120                          125  
 Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Thr His  
           130                          135                          140  
 Arg Ser Ser Gly Ser Val Asn Thr Ala Asn His Phe Asn Ala Trp Ala  
           145                          150                          155                          160  
 Gln Gln Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val  
                           165                          170                          175  
 Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser  
           180                          185                          190

<210> 18

<211> 596

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX synthetic sequence

<400> 18

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ctagctaagg aggctgcaga tgcaaacaat acaaccagga accggttaca acaacgggta 60
cttttacagc tattggaacg atggccatgg tgggtgttacc tatacaaacg ggcccggagg 120
ccaatttagc gtcaattggt ctaactccgg aaacttcgta ggtggaaaag gttggcaacc 180
cgggaccaa aataagggtga tcaacttctc tggatcttat aatccgaatg ggaattcata 240
cttaagcgtc tatggctggt ctagaaaccc actgattgaa tattacattg tcgaaaattt 300
cggtagctac aatccgagta ccggcgccac aaaattaggc gaagtcacta gtgatggatc 360
cgtatatgat atctaccgta cccaacgcgt taatcagcca tcgatcattg gaaccgccac 420
cttttatcag tactggagtg ttagacgtaa tcatcggagc tccggttcgg ttaatactgc 480
gaatcacttt aatgcatggg cacagcaagg gttaacccta ggtacaatgg attatcaaat 540
cgtagcggtg gaaggctact tctcgagtgg ttccgctagt attacagtga gctaaa 596
  
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<210> 19

<211> 40

<212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:Trx-110C  
         Synthetic Sequence  
  
 <400> 19  
 atatacggat ccatcacaag tgacttcgcc taattttgtg 40  
  
  
 <210> 20  
 <211> 68  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:Tx-110C-2  
  
 <400> 20  
 gcgccacaaa attaggcgaa gtcacttgtg atggatccgt atatgatatc taccgtagcc 60  
 aacgcgtt 68  
  
  
 <210> 21  
 <211> 42  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:Tx-103b  
  
 <400> 21  
 aatcagccat cgatcattgg aaccgccacc ttttatcagt ac 42  
  
  
 <210> 22  
 <211> 54  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:XyTv-109  
         Synthetic sequence  
  
 <400> 22  
 ggtggcgggt ccaatgatcg atggctgatt aacgcggttg gtacggtaga tatc 54  
  
  
 <210> 23  
 <211> 48  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:Tx-108b

<400> 23  
 cgaaccggag ctccgatgat tacgtctaac actccagtag tgataaaa 48

<210> 24  
 <211> 52  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Tx-154C  
 Synthetic sequence

<400> 24  
 ctagggttaa cccttgtgat gcccaggcat taaagtggca tgcagtatta ac 52

<210> 25  
 <211> 84  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Tx-154C-2

<400> 25  
 tggagtgtta gacgtaatca tcggagctcc ggttcgggta atactgcatg ccactttaat 60  
 gcctgggcac agcaagggtt aacc 84

<210> 26  
 <211> 34  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Tx-162H-3

<400> 26  
 ccacttcaat gcatgggcac agcacgggtt aacc 34

<210> 27  
 <211> 42  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:TrX-162H-4

<400> 27  
 ctagggttaa cccgtgctgt gcccatgcat tgaagtggca tg 42

<210> 28  
 <211> 58



<212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:XyTv-101  
  
 <400> 28  
 tcgacaattt cggtagctac aatccgagta ccggcgccac aaaattaggc gaagtcac 58  
  
 <210> 29  
 <211> 52  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:XyTv-102  
  
 <400> 29  
 tagtgatgga tccgtatatg atatctaccg tacccaacgc gttaatcagc ca 52  
  
 <210> 30  
 <211> 60  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:TrX-103  
  
 <400> 30  
 tcgatcattg gaaccgccac cttttatcag tactggagtg ttagacgtaa tcatcggagc 60  
  
 <210> 31  
 <211> 69  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:XyTv-104  
  
 <400> 31  
 tccggttcgg ttaatactgc gaatcacttt aatgcatggg cacagcaagg gttaacccta 60  
 ggtacaatg 69  
  
 <210> 32  
 <211> 67  
 <212> DNA  
 <213> Artificial Sequence  
  
 <220>  
 <223> Description of Artificial Sequence:XyTv-105

<400> 32  
gattatcaaa tcgtagcggg ggaaggctac ttctcgagt gttccgctag tattacagtg 60  
agctaaa 67

<210> 33  
<211> 53  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:XyTv-106  
synthetic sequence

<400> 33  
gatcttttagc tcaactgtaat actagcggaa ccaactcgaga agtagccttc cac 53

<210> 34  
<211> 66  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:XyTv-107

<400> 34  
cgctacgatt tgataatcca ttgtacctag ggtaaccct tgctgtgccc atgcattaaa 60  
gtgatt 66

<210> 35  
<211> 60  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:TrX-108

<400> 35  
cgcagtatta accgaaccgg agctccgatg attacgtcta acactccagt actgataaaa 60

<210> 36  
<211> 73  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:XyTv-110

<400> 36  
atatacggat ccatcactag tgacttcgcc taattttgtg gcgccggtac tcggattgta 60  
ggtaccgaaa ttg 73

<210> 37  
<211> 76  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:TrX-1

<400> 37  
ctagctaagg aggctgcaga tgcaaacaat acaaccagga accggttaca acaacggtta 60  
cttttacagc tattgg 76

<210> 38  
<211> 78  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:XyTv-2

<400> 38  
aacgatggcc atgggtggtgt tacctataca aacggggcccg gaggccaatt tagcgtcaat 60  
tgggtctaact ccggaaac 78

<210> 39  
<211> 78  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:TrX-3

<400> 39  
ttcgtaggtg gaaaagggtg gcaaccgagg accaaaaata aggtgatcaa cttctctgga 60  
tcttataatc cgaatggg 78

<210> 40  
<211> 74  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:XyTv-4

<400> 40  
aattcatact taagcgtcta tggctggtct agaaaccac tgattgaata ttacattgtc 60  
gaaaatttcg gtac 74

<210> 41  
<211> 85  
<212> DNA  
<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:XyTv-5

<400> 41

gcaaattttc gacaatgtaa tattcaatca gtgggtttct agaccagcca tagacgctta 60  
agtatgaatt cccattcgga ttata 85

<210> 42

<211> 78

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:Trx-6Synthetic  
sequence

<400> 42

agatccagag aagttgatca ccttattttt ggtcccgggt tgccaacctt ttccacctac 60  
gaagtttccg gagttaga 78

<210> 43

<211> 84

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:XyTv-7  
Synthetic sequence

<400> 43

ccaattgacg ctaaattggc ctccggggccc gtttgatatag gtaacaccac catggccatc 60  
gttccaatag ctgtaaaagt aacc 84

<210> 44

<211> 51

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX-8 synthetic  
sequence

<400> 44

gttggtgtaa ccggttcctg gttgtattgt ttgcatctgc agcctcctta g 51

<210> 45

<211> 40

<212> DNA

<213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Tx-108C  
 synthetic sequence

<400> 45  
 atatacggat ccatcactag tgcattcgcc taattttgtg 40

<210> 46  
 <211> 68  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Tx-108C-2

<400> 46  
 gcgccacaaa attaggcgaa tgcactagt atggatccgt atatgatatc taccgtaacc 60  
 aacgcgtt 68

<210> 47  
 <211> 52  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Tx-158C-162H  
 synthetic sequence

<400> 47  
 ctagggttaa cccgtgtgat gccagcaat taaagtgatt tgcagtatta ac 52

<210> 48  
 <211> 84  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Tx-158C-162H-2

<400> 48  
 tggagtgtta gacgtaatca tcggagctcc ggttcgggta atactgcaaa tcactttaat 60  
 tgctgggcac agcacgggtt aacc 84

<210> 49  
 <211> 40  
 <212> DNA  
 <213> Artificial Sequence

<220>  
 <223> Description of Artificial Sequence:Tx-108C-110C  
 synthetic sequence

<400> 49  
atatacggat ccatcacaag tgcattcgcc taattttgtg 40

<210> 50  
<211> 68  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:Tx-108C-110C-2  
synthetic sequence

<400> 50  
gcgccacaaa attaggcgaa tgcacttggtg atggatccgt atatgatatc taccgtaacc 60  
aacgcggt 68

<210> 51  
<211> 52  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial  
Sequence:Tx-154C-158C-152H synthetic sequeunce

<400> 51  
ctaggggttaa cccgtgtgat gccagcaat taaagtggca tgcagtatta ac 52

<210> 52  
<211> 84  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial  
Sequence:Tx-154C-158C-162H-2

<400> 52  
tggagtgtta gacgtaatca tcggagctcc ggttcgggtta atactgcatg ccactttaat 60  
tgctgggcac agcacgggtt aacc 84

<210> 53  
<211> 190  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:TrX amino acid  
sequence

<400> 53

Gln Thr Ile Gln Pro Gly Thr Gly Tyr Asn Asn Gly Tyr Phe Tyr Ser  
1 5 10 15

Tyr Trp Asn Asp Gly His Gly Gly Val Thr Tyr Thr Asn Gly Pro Gly  
20 25 30

Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly  
35 40 45

Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly  
50 55 60

Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser  
65 70 75 80

Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr  
85 90 95

Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Ser Asp Gly  
100 105 110

Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile  
115 120 125

Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His  
130 135 140

Arg Ser Ser Gly Ser Val Asn Thr Ala Asn His Phe Asn Ala Trp Ala  
145 150 155 160

Gln Gln Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val  
165 170 175

Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser  
180 185 190

<210> 54

<211> 198

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX-DS1  
cassette

<400> 54

gcgccacaaa attaggcgaa gtcacttggtg atggatccgt atatgatatc taccgtaccc 60  
aacgcgttaa tcagccatcg atcattggaa ccgccacctt ttatcagtac tggagtgtta 120  
gacgtaatca tcggagctcc ggttcgggta atactgcatg ccactttaat gcctggggcac 180  
agcaagggtt aaccctag 198

<210> 55

<211> 67

<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:TrX-DS1  
cassette aa

<400> 55  
Gly Ala Thr Lys Leu Gly Glu Val Thr Cys Asp Gly Ser Val Tyr Asp  
1 5 10 15  
Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile Ile Gly Thr Ala  
20 25 30  
Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His Arg Ser Ser Gly  
35 40 45  
Ser Val Asn Thr Ala Cys His Phe Asn Ala Trp Ala Gln Gln Gly Leu  
50 55 60  
Thr Leu Gly  
65

<210> 56  
<211> 15  
<212> PRT  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:TrX-162H-DS1  
cassette aa

<400> 56  
Ala Cys His Phe Asn Ala Trp Ala Gln His Gly Leu Thr Leu Gly  
1 5 10 15

<210> 57  
<211> 198  
<212> DNA  
<213> Artificial Sequence

<220>  
<223> Description of Artificial Sequence:TrX-162H-DS2  
cassette

<400> 57  
gcgccacaaa attagggcga tgcactagtg atggatccgt atatgatatc taccgtaccc 60  
aacgcgttaa tcagccatcg atcattggaa ccgccacctt ttatcagtac tggagtgtta 120  
gacgtaatca tcggagctcc gggttcggta atactgcaaa tcactttaat tgctggggcac 180  
agcacggggtt aaccctag 198

<210> 58  
<211> 67  
<212> PRT



<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX-162H-DS2  
cassette aa

<400> 58

Gly Ala Thr Lys Leu Gly Glu Cys Thr Ser Asp Ser Ser Val Tyr Asp  
1 5 10 15

Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile Ile Gly Thr Ala  
20 25 30

Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His Arg Ser Ser Gly  
35 40 45

Ser Val Asn Thr Ala Asn His Phe Asn Cys Trp Ala Gln His Gly Leu  
50 55 60

Thr Leu Gly  
65

<210> 59

<211> 198

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX-162H-DS4  
cassette

<400> 59

ggcgcacaaa attagggcga tgcacttggtg atggatccgt atatgatatc taccgtaccc 60  
aacgcgttaa tcagccatcg atcattggaa ccgccacctt ttatcagtac tggagtgtta 120  
gacgtaataca tcggagctcc gggttcggta atactgcatg ccactttaat tgctggggcac 180  
agcacggggtt aaccctag 198

<210> 60

<211> 67

<212> PRT

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX-162H-DS4  
cassete aa

<400> 60

Gly Ala Thr Lys Leu Gly Glu Cys Thr Cys Asp Gly Ser Val Tyr Asp  
1 5 10 15

Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile Ile Gly Thr Ala  
20 25 30

Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His Arg Ser Ser Gly  
35 40 45

Ser Val Asn Thr Ala Cys His Phe Asn Cys Trp Ala Gln His Gly Leu  
50 55 60

Thr Leu Gly  
65

<210> 61

<211> 42

<212> DNA

<213> Artificial Sequence

<220>

<223> Description of Artificial Sequence:TrX-162H-DS1  
cassette

<400> 61

catgccactt caatgcatgg gcacagcacg gggttaaccct ag

42

<210> 62

<211> 190

<212> PRT

<213> Artificial Sequence

<220>

<223> TrX-162H-DS1

<400> 62

Gln Thr Ile Gln Pro Gly Thr Gly Tyr Asn Asn Gly Tyr Phe Tyr Ser  
1 5 10 15

Tyr Trp Asn Asp Gly His Gly Gly Val Thr Tyr Thr Asn Gly Pro Gly  
20 25 30

Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly  
35 40 45

Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly  
50 55 60

Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser  
65 70 75 80

Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr  
85 90 95

Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Val Thr Cys Asp Gly  
100 105 110

Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile  
115 120 125

Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His  
130 135 140

Arg Ser Ser Gly Ser Val Asn Thr Ala Cys His Phe Asn Ala Trp Ala  
145 150 155 160

Gln His Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val  
165 170 175

Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser  
180 185 190

<210> 63

<211> 190

<212> PRT

<213> Artificial Sequence

<220>

<223> TrX-162H-DS2

<400> 63

Gln Thr Ile Gln Pro Gly Thr Gly Tyr Asn Asn Gly Tyr Phe Tyr Ser  
1 5 10 15

Tyr Trp Asn Asp Gly His Gly Gly Val Thr Tyr Thr Asn Gly Pro Gly  
20 25 30

Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly  
35 40 45

Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly  
50 55 60

Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser  
65 70 75 80

Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr  
85 90 95

Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Cys Thr Ser Asp Gly  
100 105 110

Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile  
115 120 125

Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His  
130 135 140

Arg Ser Ser Gly Ser Val Asn Thr Ala Asn His Phe Asn Cys Trp Ala  
145 150 155 160

Gln His Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val  
165 170 175

Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser  
180 185 190

<210> 64  
 <211> 190  
 <212> PRT  
 <213> Artificial Sequence

<220>  
 <223> TrX-162H-DS4

<400> 64  
 Gln Thr Ile Gln Pro Gly Thr Gly Tyr Asn Asn Gly Tyr Phe Tyr Ser  
     1                    5                    10                    15  
 Tyr Trp Asn Asp Gly His Gly Gly Val Thr Tyr Thr Asn Gly Pro Gly  
                     20                    25                    30  
 Gly Gln Phe Ser Val Asn Trp Ser Asn Ser Gly Asn Phe Val Gly Gly  
                     35                    40                    45  
 Lys Gly Trp Gln Pro Gly Thr Lys Asn Lys Val Ile Asn Phe Ser Gly  
     50                    55                    60  
 Ser Tyr Asn Pro Asn Gly Asn Ser Tyr Leu Ser Val Tyr Gly Trp Ser  
     65                    70                    75                    80  
 Arg Asn Pro Leu Ile Glu Tyr Tyr Ile Val Glu Asn Phe Gly Thr Tyr  
                     85                    90                    95  
 Asn Pro Ser Thr Gly Ala Thr Lys Leu Gly Glu Cys Thr Cys Asp Gly  
                     100                    105                    110  
 Ser Val Tyr Asp Ile Tyr Arg Thr Gln Arg Val Asn Gln Pro Ser Ile  
                     115                    120                    125  
 Ile Gly Thr Ala Thr Phe Tyr Gln Tyr Trp Ser Val Arg Arg Asn His  
     130                    135                    140  
 Arg Ser Ser Gly Ser Val Asn Thr Ala Cys His Phe Asn Cys Trp Ala  
     145                    150                    155                    160  
 Gln His Gly Leu Thr Leu Gly Thr Met Asp Tyr Gln Ile Val Ala Val  
                     165                    170                    175  
 Glu Gly Tyr Phe Ser Ser Gly Ser Ala Ser Ile Thr Val Ser  
                     180                    185                    190

<210> 65  
 <211> 190  
 <212> PRT  
 <213> Artificial Sequence

<220>

<223> TrX-DS8

<400> 65

Gln	Thr	Ile	Gln	Pro	Gly	Thr	Gly	Tyr	His	Asn	Gly	Tyr	Phe	Tyr	Ser
1				5					10					15	
Tyr	Trp	Asn	Asp	Gly	His	Gly	Gly	Val	Thr	Met	Thr	Leu	Gly	Pro	Gly
			20					25					30		
Gly	Gln	Phe	Ser	Val	Asn	Trp	Ser	Asn	Ser	Gly	Asp	Phe	Val	Gly	Gly
		35					40					45			
Lys	Gly	Trp	Gln	Pro	Gly	Thr	Lys	Asn	Lys	Val	Ile	Asn	Phe	Ser	Gly
	50					55					60				
Ser	Tyr	Asn	Pro	Asn	Gly	Asn	Ser	Tyr	Leu	Ser	Val	Tyr	Gly	Trp	Ser
65					70					75					80
Arg	Asn	Pro	Leu	Ile	Glu	Tyr	Tyr	Ile	Val	Glu	Asn	Phe	Gly	Thr	Tyr
				85					90						95
Asn	Pro	Ser	Thr	Gly	Ala	Thr	Lys	Leu	Gly	Glu	Val	Thr	Cys	Asp	Gly
			100					105						110	
Ser	Val	Tyr	Asp	Ile	Tyr	Arg	Thr	Gln	Arg	Val	Asn	Ala	Pro	Ser	Ile
		115					120					125			
Glu	Gly	Thr	Ala	Thr	Phe	Tyr	Gln	Tyr	Trp	Ser	Val	Arg	Arg	Asn	His
	130					135						140			
Arg	Ser	Ser	Gly	Ser	Val	Asn	Thr	Ala	Cys	His	Phe	Asn	Ala	Trp	Ala
145					150					155					160
Gln	His	Gly	Leu	Thr	Leu	Gly	Thr	Met	Asp	Tyr	Gln	Ile	Val	Ala	Val
				165					170					175	
Glu	Gly	Tyr	Phe	Ser	Ser	Gly	Ser	Ala	Ser	Ile	Thr	Val	Ser		
			180					185					190		